



May 09, 2016

Meagan E. Ormand Golder Associates Inc. 2108 W. Laburnum Ave. Suite 200 Richmond, VA 23227

RE: Project: Bremo Monthly Process Pace Project No.: 92296481

#### Dear Meagan Ormand:

Enclosed are the analytical results for sample(s) received by the laboratory on May 05, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Analyses were performed at the Pace Analytical Services location indicated on the sample analyte page for analysis unless otherwise footnoted.

Some analyses have been subcontracted outside of the Pace Network. The subcontracted laboratory report has been attached.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Nicole Gasiorowski

Micolo Yasiorovske

nicole.gasiorowski@pacelabs.com

**Project Manager** 

Enclosures





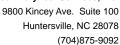
9800 Kincey Ave. Suite 100 Huntersville, NC 28078 (704)875-9092



May 09, 2016 Page 2

cc: Ron DiFrancesco, Golder Associates Inc. Mike Williams, Golder Associates Inc







#### **CERTIFICATIONS**

Project: Bremo Monthly Process

Pace Project No.: 92296481

**Ormond Beach Certification IDs** 

8 East Tower Circle, Ormond Beach, FL 32174

Alabama Certification #: 41320 Connecticut Certification #: PH-0216

Delaware Certification: FL NELAC Reciprocity

Florida Certification #: E83079 Georgia Certification #: 955

Guam Certification: FL NELAC Reciprocity Hawaii Certification: FL NELAC Reciprocity

Illinois Certification #: 200068

Indiana Certification: FL NELAC Reciprocity

Kansas Certification #: E-10383

Louisiana Certification #: FL NELAC Reciprocity Louisiana Environmental Certificate #: 05007

Maryland Certification: #346 Michigan Certification #: 9911

Mississippi Certification: FL NELAC Reciprocity

Missouri Certification #: 236 Montana Certification #: Cert 0074 Nebraska Certification: NE-OS-28-14 Nevada Certification: FL NELAC Reciprocity

New York Certification #: 11608

North Carolina Environmental Certificate #: 667

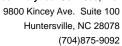
North Carolina Certification #: 12710
North Dakota Certification #: R-216
Oklahoma Certification #: D9947
Pennsylvania Certification #: 68-00547
Puerto Rico Certification #: FL01264
South Carolina Certification: #96042001
Tennessee Certification #: TN02974
Texas Certification: FL NELAC Reciprocity

Texas Certification: FL NELAC Reciprocity US Virgin Islands Certification: FL NELAC Reciprocity

Virginia Environmental Certification #: 460165
Wyoming Certification: FL NELAC Reciprocity

West Virginia Certification #: 9962C Wisconsin Certification #: 399079670

Wyoming (EPA Region 8): FL NELAC Reciprocity





#### **SAMPLE ANALYTE COUNT**

Project: Bremo Monthly Process

Pace Project No.: 92296481

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory	
92296481001	T1-160505-1245-S3	EPA 200.7	CKJ	8	PASI-O	•

(704)875-9092



#### **PROJECT NARRATIVE**

Project: Bremo Monthly Process

Pace Project No.: 92296481

Method: EPA 200.7
Description: 200.7 MET ICP

Client: Golder\_Dominion\_Bremo

Date: May 09, 2016

#### **General Information:**

1 sample was analyzed for EPA 200.7. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Sample Preparation:

The samples were prepared in accordance with EPA 200.7 with any exceptions noted below.

#### Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

#### **Continuing Calibration:**

All criteria were within method requirements with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

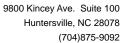
All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

#### **Additional Comments:**

This data package has been reviewed for quality and completeness and is approved for release.





#### **ANALYTICAL RESULTS**

Project: Bremo Monthly Process

Pace Project No.: 92296481

Date: 05/09/2016 10:55 AM

Sample: T1-160505-1245-S3	Lab ID: 9229	6481001	Collected: 05/05/1	6 12:4	5 Received: 05	5/05/16 13:48 M	Matrix: Water	
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
200.7 MET ICP	Analytical Meth	od: EPA 20	0.7 Preparation Met	hod: El	PA 200.7			
Aluminum	1030	ug/L	100	1	05/06/16 12:10	05/06/16 15:58	7429-90-5	
Barium	194	ug/L	10.0	1	05/06/16 12:10	05/06/16 15:58	7440-39-3	
Beryllium	ND	ug/L	1.0	1	05/06/16 12:10	05/06/16 15:58	7440-41-7	
Boron	486	ug/L	50.0	1	05/06/16 12:10	05/06/16 15:58	7440-42-8	
Cobalt	ND	ug/L	10.0	1	05/06/16 12:10	05/06/16 15:58	7440-48-4	
Iron	ND	ug/L	250	1	05/06/16 12:10	05/06/16 15:58	7439-89-6	
Molybdenum	178	ug/L	10.0	1	05/06/16 12:10	05/06/16 15:58	7439-98-7	
Vanadium	21.4	ug/L	10.0	1	05/06/16 12:10	05/06/16 15:58	7440-62-2	



#### **QUALITY CONTROL DATA**

Project: Bremo Monthly Process

Pace Project No.: 92296481

Date: 05/09/2016 10:55 AM

QC Batch: MPRP/30260 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 MET

Associated Lab Samples: 92296481001

METHOD BLANK: 1564784 Matrix: Water

Associated Lab Samples: 92296481001

		Blank	Reporting		
Parameter	Units	Result	Limit	Analyzed	Qualifiers
Aluminum	ug/L	ND	100	05/06/16 15:46	
Barium	ug/L	ND	10.0	05/06/16 15:46	
Beryllium	ug/L	ND	1.0	05/06/16 15:46	
Boron	ug/L	ND	50.0	05/06/16 15:46	
Cobalt	ug/L	ND	10.0	05/06/16 15:46	
Iron	ug/L	ND	250	05/06/16 15:46	
Molybdenum	ug/L	ND	10.0	05/06/16 15:46	
Vanadium	ug/L	ND	10.0	05/06/16 15:46	

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Aluminum	ug/L	2500	2520	101	85-115	
Barium	ug/L	250	254	102	85-115	
Beryllium	ug/L	25	25.6	102	85-115	
Boron	ug/L	2500	2460	99	85-115	
Cobalt	ug/L	250	258	103	85-115	
Iron	ug/L	2500	2500	100	85-115	
Molybdenum	ug/L	250	252	101	85-115	
Vanadium	ug/L	250	248	99	85-115	

MATRIX SPIKE & MATRIX SPI	KE DUPLICAT	E: 15647	86		1564787						
			MS	MSD							
	922	296481001	Spike	Spike	MS	MSD	MS	MSD	% Rec		
Parameter	Units	Result	Conc.	Conc.	Result	Result	% Rec	% Rec	Limits	RPD	Qual
Aluminum	ug/L	1030	2500	2500	3560	3520	101	100	70-130	1	
Barium	ug/L	194	250	250	445	445	101	100	70-130	0	
Beryllium	ug/L	ND	25	25	25.6	25.5	102	102	70-130	0	
Boron	ug/L	486	2500	2500	2920	2940	97	98	70-130	1	
Cobalt	ug/L	ND	250	250	256	254	102	102	70-130	1	
Iron	ug/L	ND	2500	2500	2530	2500	100	99	70-130	1	
Molybdenum	ug/L	178	250	250	431	430	101	101	70-130	0	
Vanadium	ug/L	21.4	250	250	268	269	98	99	70-130	0	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.



#### **QUALIFIERS**

Project: Bremo Monthly Process

Pace Project No.: 92296481

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether, Styrene, and Vinyl chloride.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

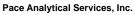
Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

#### **LABORATORIES**

Date: 05/09/2016 10:55 AM

PASI-O Pace Analytical Services - Ormond Beach





9800 Kincey Ave. Suite 100 Huntersville, NC 28078 (704)875-9092

#### **QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: Bremo Monthly Process

Pace Project No.: 92296481

Date: 05/09/2016 10:55 AM

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92296481001	T1-160505-1245-S3	EPA 200.7	MPRP/30260	EPA 200.7	ICP/18084

# ace Analytical

#### Document Name:

#### Sample Condition Upon Receipt(SCUR)

Document No.:

Document Revised: 26FEB2016 Page 1 of 2

Issuing Authority: F-MEC-CS-009-rev.02 Pace Mechanicsville Quality Office ple Condition Upon \* Client Name: Page 2 of 2 for Internal Use ONLY WO#: 92296481 Project #: Courier: Client Commer cial Other: Custody Seal Present? Seals Intact? No Date/Initials Person Examining Contents Packing Material: Bubble Wrap Bubble Bags None Other: Thermometer: RMD001 Wet Type of Ice: Blue None Samples on ice, cooling process has begun Correction Factor: 0.0°C Cooler Temp Corrected (°C): Biological Tissue Frozen? Temp should be above freezing to 6°C Yes CN N/A USDA Regulated Soil ( N/A, water sample) Did samples or iginate in a quarantine zone within the United States: CA, NY, or SC (check maps)? Did samples originate from a foreign source (internationally, Yes No including Hawaii and Puerto Rico)? Yes No COMMENTS: Chain of Custo dy Present? Yes ☐ No □N/A 1. Chain of Custo dy Filled Out? Yes □No □N/A 2. Chain of Custody Relinquished? Yes □No □N/A 3. Sampler Name and/or Signature on COC? Yes □No □N/A 4. Samples Arrived within Hold Time? Yes □No □N/A 5. Short Hold Time Analysis (<72 hr)? No □N/A 6. Rush Turn Around Time Requested? Yes □No □N/A 7. Sufficient Volume? Yes Пио □N/A 8. Correct Containers Used? Yes No □N/A 9. -Pace Containers Used? Yes □No □N/A Containers Intact? Ves No □N/A 10. Filtered Volume Received for Dissolved Tests? Yes MN/A No 11. Note if sediment is visible in the dissolved container Sample Labels Match COC? Yes No □N/A 12. -Includes Date/Time/ID/Analysis Matrix: All containers needing acid/base preservation have been checked? 13. Yes □No □N/A All containers needing preservation are found to be in compliance with EPA recommendation? (HNO₃, H₂SO₄, HCI<2; NaOH >9 Sulfide, NaOH>12 Cyanide) Yes No □N/A Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC,LLHg Yes □ No N/A Samples checked for dechlorination □Yes □No M/A 14. Headspace in VOA Vials (>5-6mm)? ☐Yes No M/A 15. Trip Blank Present? Yes □No N/A 16. Trip Blank Custody Seals Present? Yes □No Pace Trip Blank Lot # (if purchased):

CLIENT NOTIFICATION/RESOLUTION Field Data Required? Yes No Person Contacted: Date/Time: Comments/Resolution: Project Manager SCURF Review: Project Manager SRF Review: Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers)

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				er Golder-Pace MSA	ADDITIONAL COMMENTS												1245					24 HOUR	Fax: 804-358-2900	older.com	4 23227	urnum Ave, Ste 200	ciates		ibs.com
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## Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

#### ANALYTICAL RESULTS

Prepared by:

Prepared for:

Eurofins Lancaster Laboratories Environmental 2425 New Holland Pike Lancaster, PA 17601 Pace Analytical Services Suite 100 9800 Kincey Ave Huntersville NC 28078

Report Date: May 09, 2016

Project: 92296481

Submittal Date: 05/06/2016 Group Number: 1657854 PO Number: NMG 15388 State of Sample Origin: VA

Client Sample Description T1-160505-1245-S3 Water Lancaster Labs (LL) # 8367779

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our scopes of accreditation can be viewed at <a href="http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/">http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/</a>.

Electronic Copy To Pace Analytical Services Attn: Nicole Gasiorowski

Respectfully Submitted,

Bonnie Stadelmann Senior Project Manager

Bornie Stadelmann

(312) 590-3133



#### **Lancaster Laboratories Environmental**

## Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: T1-160505-1245-S3 Water

92296481001

LL Sample # WW 8367779 LL Group # 1657854 # 10945 Account

Project Name: 92296481

Collected: 05/05/2016 12:45

Pace Analytical Services

Suite 100

9800 Kincey Ave

Huntersville NC 28078

Reported: 05/09/2016 10:34

Submitted: 05/06/2016 09:20

CAT Analysis Name No.

CAS Number

Result

Limit of Quantitation Dilution Factor

Wet Chemistry 12941 Free Cyanide OIA-1677-09

mg/l < 10.0 mg/l 10.0

Sample Comments

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

#### Laboratory Sample Analysis Record

CAT	Analysis Name	Method	Trial#	Batch#	Analysis	Analyst	Dilution
No.					Date and Time		Factor
12941	Free Cyanide	OIA-1677-09	1	16129941101A	05/08/2016 14:45	Joseph E McKenzie	1



#### Lancaster Laboratories Environmental

## Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

#### Quality Control Summary

Client Name: Pace Analytical Services Group Number: 1657854

Reported: 05/09/2016 10:34

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

#### Method Blank

 Analysis Name
 Result
 LOQ

 mg/1
 mg/1

 Batch number: 16129941101A
 Sample number(s): 8367779

 Free Cyanide
 < 10.0</td>

#### LCS/LCSD

Analysis Name	LCS Spike Added mg/l	LCS Conc mg/l	LCSD Spike Added mg/l	LCSD Conc mg/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 16129941101A	Sample number	r(s): 8367	779						
Free Cyanide	0.0400	0.0412			103		86-132		

#### MS/MSD

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike

Analysis Name	Unspiked Conc mg/l	MS Spike Added mg/l	MS Conc mg/l	MSD Spike Added mg/l	MSD Conc mg/l	MS %Rec	MSD %Rec	MS/MSD Limits	RPD	RPD Max
Batch number: 16129941101A Free Cyanide	Sample numb < 10.0	er(s): 8367 0.0200	779 UNSP 0.0216	K: P370080 0.0200	0.0213	108	107	86-132	1	3

P##### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

<sup>\*-</sup> Outside of specification

<sup>(1)</sup> The result for one or both determinations was less than five times the LOQ.

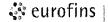
<sup>(2)</sup> The unspiked result was more than four times the spike added.

## 10945 | 1657854 | 8367779

### Chain of Custody -

Pace Analytical www.pocelobs.com

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Lancaster Laboratories Environmental

#### Sample Administration Receipt Documentation Log

Doc Log ID:

145591

Group Number(s): 1657854

Client: Pace Analytical

**Delivery and Receipt Information** 

Delivery Method:

Fed Ex

Arrival Timestamp:

05/06/2016 9:20

Number of Packages:

1

Number of Projects:

1

**Arrival Condition Summary** 

Shipping Container Sealed:

Yes

Sample IDs on COC match Containers:

Yes

**Custody Seal Present:** 

No

Sample Date/Times match COC:

Yes

Samples Chilled:

Yes

VOA Vial Headspace ≥ 6mm:

N/A

Paperwork Enclosed:

Yes

Total Trip Blank Qty:

0

Samples Intact:

Yes

Air Quality Samples Present:

No

Missing Samples:

No

Extra Samples:

No

Discrepancy in Container Qty on COC:

No

Unpacked by Krista Abel (3058) at 10:08 on 05/06/2016

Samples Chilled Details

Thermometer Types:

DT = Digital (Temp. Bottle)

IR = Infrared (Surface Temp)

All Temperatures in °C.

Cooler # Thermometer ID

Corrected Temp

Therm. Type

Ice Type

Ice Present?

Ice Container

Elevated Temp?

32170023

3.3

IR

Wet

Bagged

Ν



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## **Explanation of Symbols and Abbreviations**

The following defines common symbols and abbreviations used in reporting technical data:

RL N.D.	Reporting Limit none detected	BMQL MPN	Below Minimum Quantitation Level Most Probable Number
TNTC	Too Numerous To Count	CP Units	cobalt-chloroplatinate units
IU	International Units	NTU	nephelometric turbidity units
umhos/cm	micromhos/cm	ng	nanogram(s)
С	degrees Celsius	F	degrees Fahrenheit
meq	milliequivalents	lb.	pound(s)
g	gram(s)	kg	kilogram(s)
μg	microgram(s)	mg	milligram(s)
mL	milliliter(s)	L	liter(s)
m3	cubic meter(s)	μL	microliter(s)
		pg/L	picogram/liter

< less than

> greater than

ppm parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.

ppb parts per billion

**Dry weight basis**Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

ao 1000110a be

#### Laboratory Data Qualifiers:

B - Analyte detected in the blank

C - Result confirmed by reanalysis

E - Concentration exceeds the calibration range

J (or G, I, X) - estimated value ≥ the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)

P - Concentration difference between the primary and confirmation column >40%. The lower result is reported.

U - Analyte was not detected at the value indicated

V - Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference...

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods. Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" are not performed within 15 minutes.

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